

Fig. 1

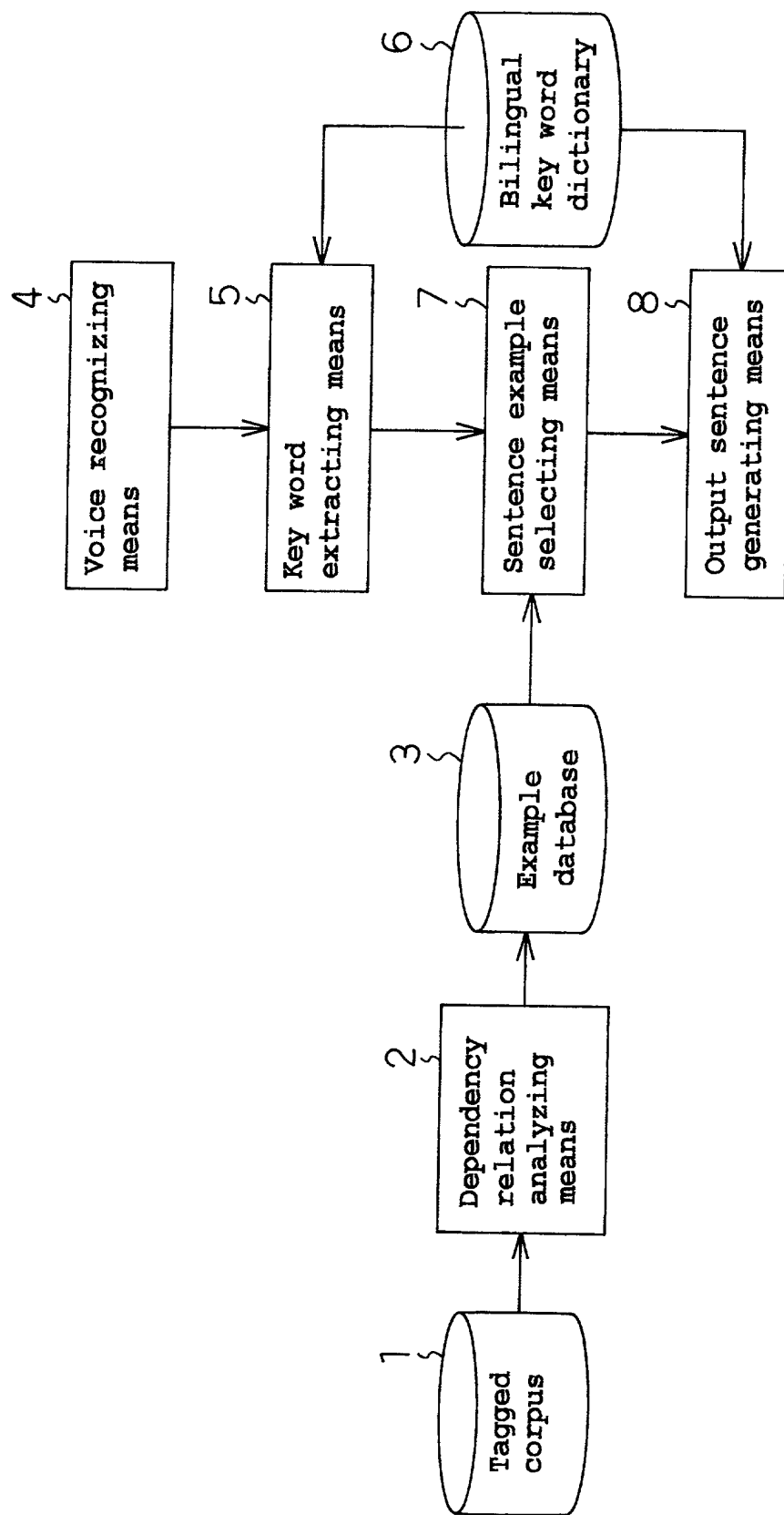


Fig. 2 (a)

Example of bilingual key word dictionary

kohi	[コーヒー]	: coffee
onagai	[お願い]	: *
miruku	[ミルク]	: milk
tsumetai	[冷たい]	: cold
ari	[あり]	: *

Example of example DB

Dependency relation	: Expression pattern
(kohi [コーヒー]→onagai [お願い])	: I'd like to coffee please.
(tsumetai [冷たい]→miruku [ミルク]) (miruku [ミルク]→ari [あり])	: Do you have a cold milk ?
...	

Fig. 2 (b)

Example of tagged corpus

Kohi (common noun) o (kaku-postpositional particle) o (prefix) negai (sahen-noun) shi (verb) masu (auxiliary verb)	
[コーヒー (一般名詞) を (格助詞) お (接頭詞) 願 (サ変名詞) し (動詞) ます (助動詞)]	
Tsumetai (adjective) miruku (common noun) ha (kei-postpositional particle) ari (verb) masu (auxiliary verb) ka (shu-postpositional particle) ...	
[冷たい (形容詞) ミルク (普通名詞) は (係助詞) あり (動詞) ます (助動詞) か (終助詞)]	
...	

Fig. 3

Example of example DB

Dependency relation	: Expression pattern
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(kohi [コ-ヒー] → onegai [お願い])	: Coffee please.
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(tsumetai [冷たい] → miruku [ミルク]) (miruku [ミルク] → ari [あり])	: Any cold milk?
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...

Fig. 4

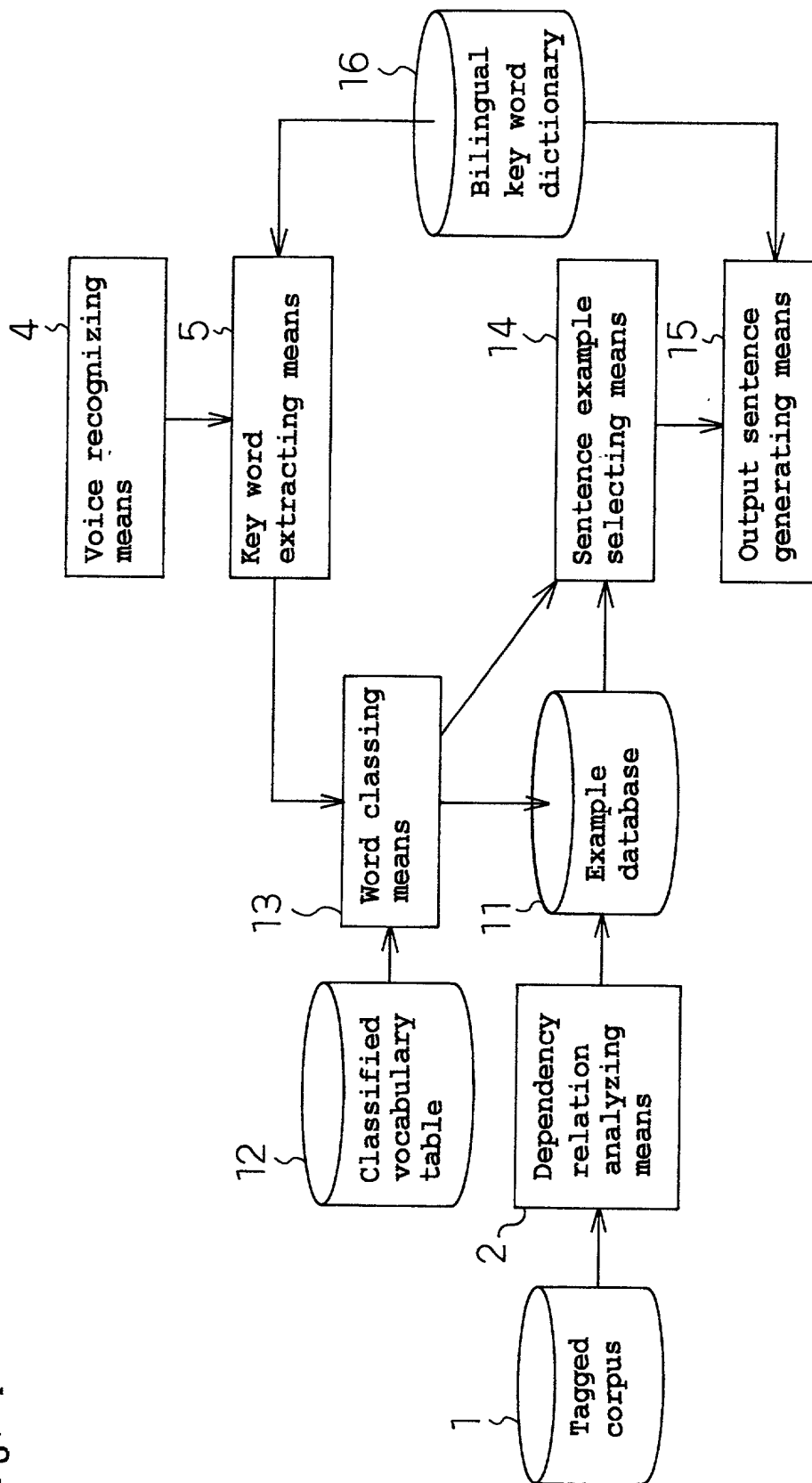


Fig. 5 (a)

Classified vocabulary table

kohi [コーヒー] (common noun [一般名詞])	100
miruku [ミルク] (common noun [一般名詞])	100
koucha [紅茶] (common noun [一般名詞])	100
...	
tsumetai [冷たい] (adjective [形容詞])	200
atsui [熱い] (adjective [形容詞])	200
...	

Fig. 5 (b)

Example of example DB

Key word	Dependency relation	Sentence example
① 100 ② onegai [お願い]	: (①→②)	: I'd like to ② please.
① 200 ② 100 ③ ari [あり]	: (①→②) (②→③)	: Do you have a ① ② ?
...		

Fig. 6

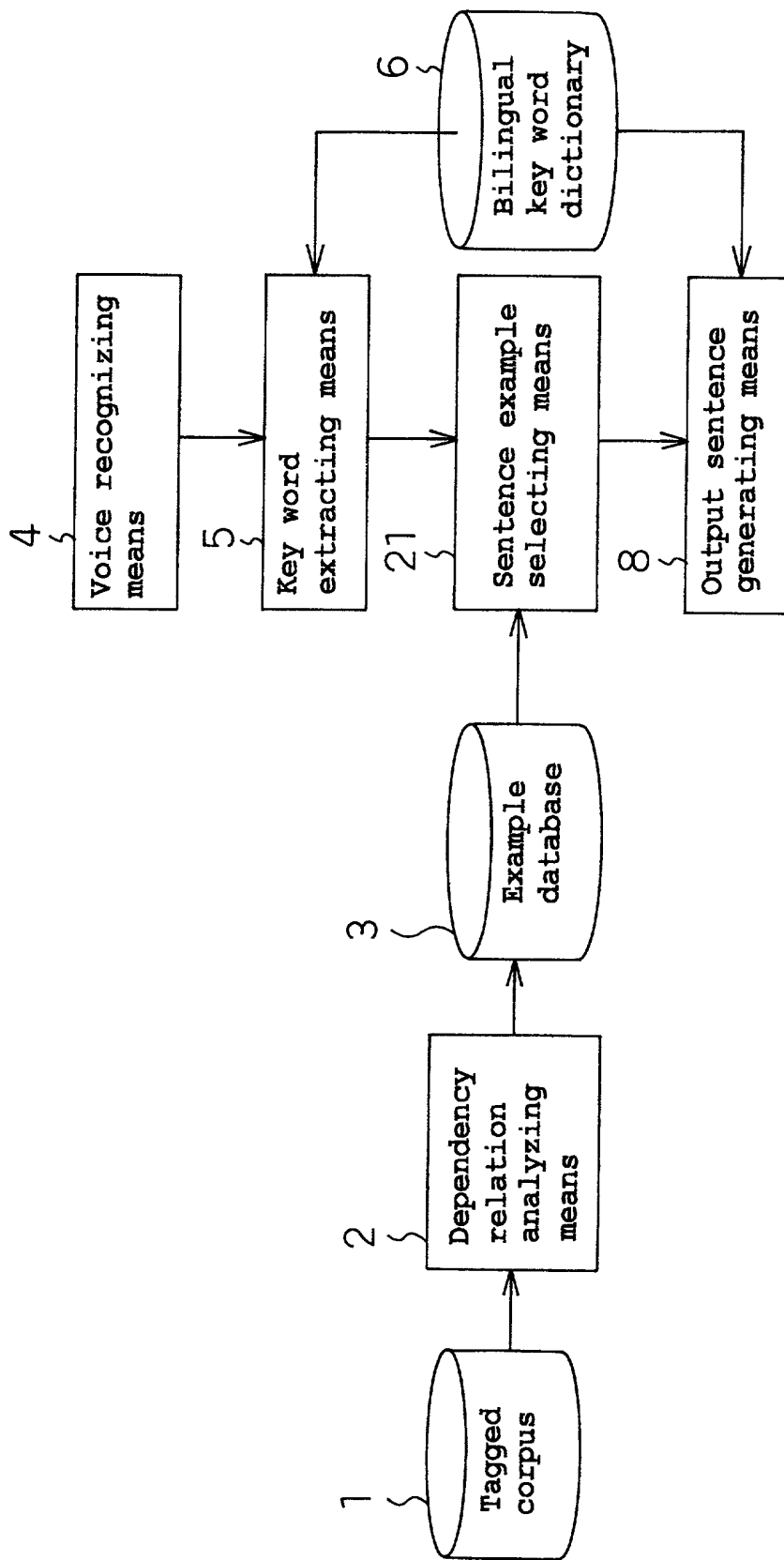


Fig. 7

Input sentence : Atsui miruku ha arimasuka [熱いミルクはありますか]
 Recognition result sentence : Aoi miruku ha arimasuka [青いミルクはありますか]

Example of example DB

Dependency relation	Sentence example
(kohi [コ-ヒ-] → onegai [お願い])	Coffee please.
(atsui [熱い] → miruku [ミルク]) (miruku [ミルク] → ari [あり])	Any hot milk ?
...	

Extracted key words : aoi [青い], miruku [ミルク], ari [あり]

Result of dependency relation comparison between the key words and example DB :

- (aoi [青い], miruku [ミルク]) ×
- (aoi [青い], ari [あり]) ×
- (miruku [ミルク], ari [あり]) ○

Fig. 8

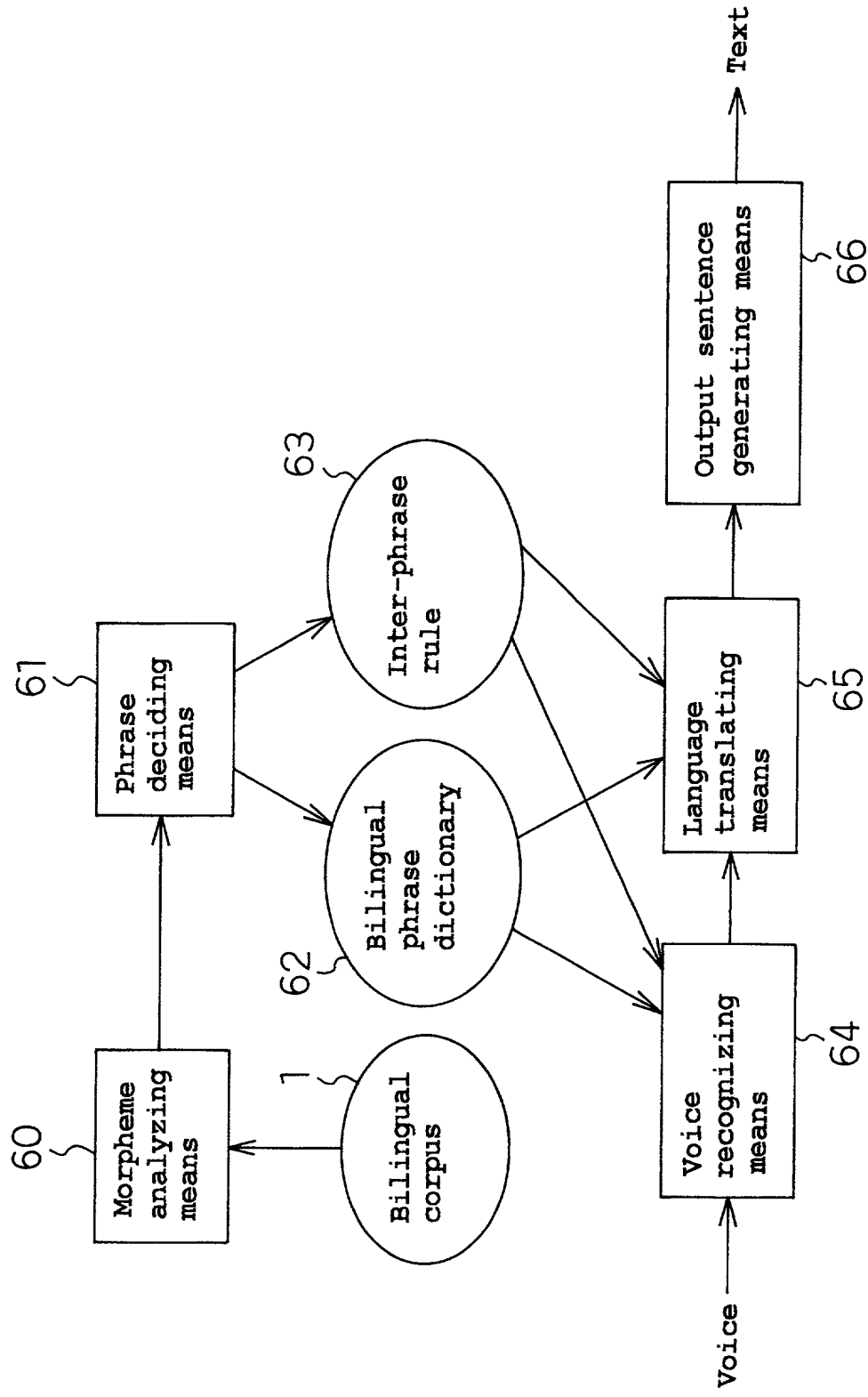


Fig. 9-1 (a)

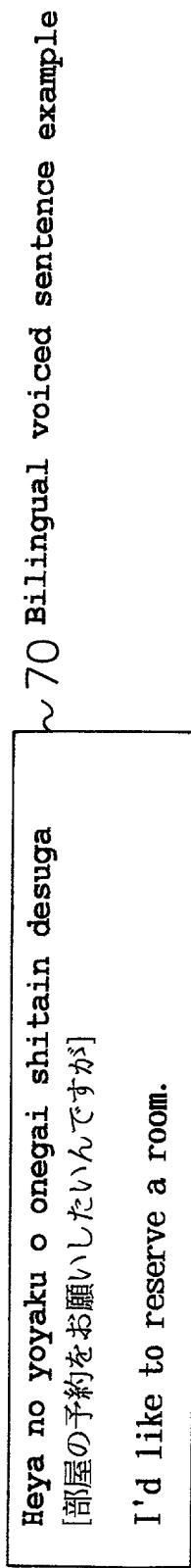


Fig. 9-1 (b)

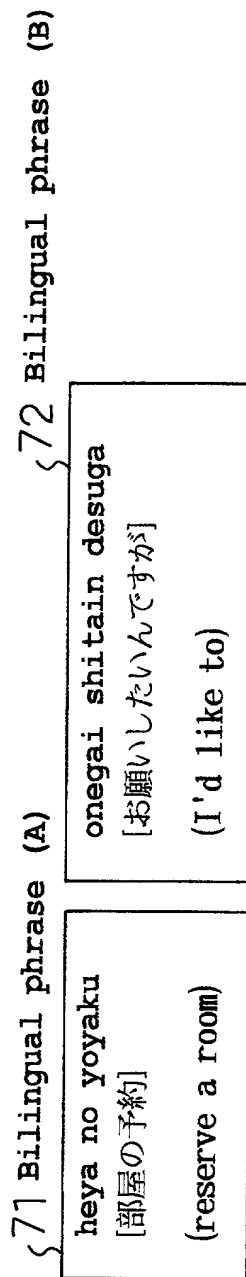


Fig. 9-1 (c)

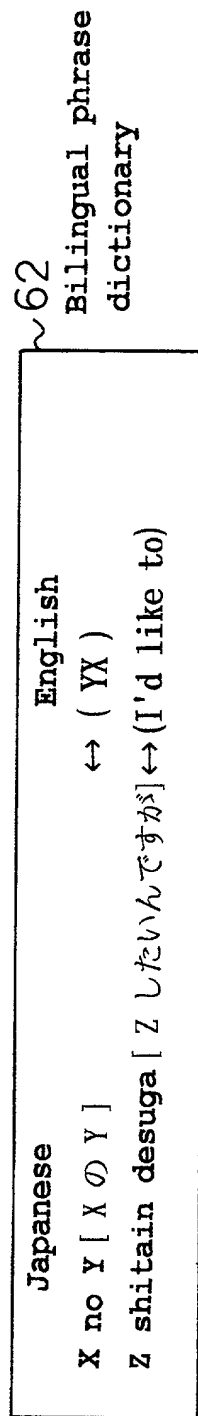


Fig. 9-2 (d)

Japanese	English
(A) o (B) suru [(A)を(B)する]	\leftrightarrow ((B) to (A))

~63 Inter-phrase rule

Fig. 9-2 (e)

X (heya [部屋], kaigishitsu [会議室], kuruma [車], ...)
Y (yoyaku [予約], keiyaku [契約], ...)
Z (onégai [お願い], tanomu [たのむ], ...)

~64

Classified vocabulary
table

Fig. 10 (a)

Example of bilingual key word dictionary

coffee	:	kohi [コ-ヒ-]
please	:	onagai [お願い]
milk	:	miruku [ミルク]
cold	:	tsumetai [冷たい]
have	:	ari [あり]

Example of example DB

Dependency relation	Expression pattern
(coffee→please)	: Kohi o onagai shimasu [コ-ヒ-をお願いします]
(cold→milk) (milk→have)	: Tsumetai miruku ha arimasuka [冷たいミルクはありますか]
...	

Fig. 10 (b)

Example of tagged corpus

I (pronoun) 'd (auxiliary verb) like (verb) to (determiner) coffee (common noun) please (adverb) ...
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Fig. 11 (a)

Classified vocabulary table

coffee (common noun)	100
milk (common noun)	100
tea (common noun)	100
...	
cold (adjective)	200
hot (adjective)	200
...	

Fig. 11 (b)

Example of example DB

Key word	: Dependency relation	: Sentence example
① 100 ② please	: ① o [を] ② shimasu [します]	① o [を] ② shimasu [します]
① 200 ② 100 ③ have	: (①→②) (②→③)	: ①② ha [は] ③ masuka [ますか]
...		

Fig. 12

Input sentence : Do you have a hot milk ?
 Recognition result sentence : Do you have a head milk ?

Example of example DB

Dependency relation : Sentence example
 (coffee→please) : Kohi o onegai shimasu [コーヒーをお願いします]
 (hot→milk) (milk→have) : Atsui miruku ha arimasuka [熱いミルクはありますか]
 ...

Extracted key words : (have, head, milk)

Result of dependency relation comparison between the key words and example DB :

(head, milk) ×
 (head, have) ×
 (milk, have) ○

Fig. 13 (a)

Example of bilingual key word dictionary

咖啡	: kofi [コ-ヒ-]
要	: kudasai [下さい]
日文	: nihongo [日本語]
菜单	: menyu [メニュー]
有	: ari [あり]

Example of example DB

Dependency relation	: Expression pattern
(咖啡 → 要)	: Kofi o kudasai [コ-ヒ-を下さい]
(日文 → 菜单) (菜单 → 有)	: Nihongo no menyu ha arimasuka [日本語のメニューはありますか]
...	

Fig. 13 (b)

Example of tagged corpus

要 (动) 咖啡 (名词)
...

Fig. 14 (a)

Classified vocabulary table

咖啡	(名)	100
牛奶	(名)	100
红茶	(名)	100
冷	(形)	200
热	(形)	200
日文	(名)	300
菜单	(名)	400
...		

Fig. 14 (b)

Example of example DB

Key word	: Dependency relation	: Sentence example
① 100 ② 要	: (①→②)	: ① o [を] ②
① 300 ② 400 ③ 有	: (①→②) (②→③)	: ① no [の] ② ha [は] ③ masuka [ますか]
		...

Fig. 15

Input sentence : 有日文菜单吗
Recognition result sentence : 有日没菜单吗

Example of example DB

Dependency relation	: Sentence example
(咖啡 → 要)	: Kohi o kudasai [コーヒーを下さい]
(日文 → 菜单) (菜单 → 有)	: Nihongo no menyū ha arimasuka [日本語のメニューはありますか]
	...

Extracted key words : (有, 日没, 菜单)

Result of dependency relation comparison between the key words and example DB :

- (日没, 有) ×
- (日没, 菜单) ×
- (菜单, 有) ○